

IN THE CLAIMS:

Please cancel claims 43 and 46 without prejudice, and amend the claims as follows:

1 29. (Previously Presented) A polishing article for polishing a substrate, comprising:

a body having a polishing surface adapted to polish the substrate;

at least one conductive element embedded in the polishing surface, wherein the conductive element has a contact surface that extends beyond a plane defined by the polishing surface; and

one or more pockets formed in the polishing surface, wherein the conductive element is disposed in at least one of the pockets.

2 31. (Original) The polishing article of claim 29, wherein the biasing member is a spring, a foam polymer, plastic tubing, an elastomer, or combinations thereof, and urges a compliant contact surface of the conductive element to electrically contact the substrate disposed on the polishing surface.

3 32. (Previously Presented) The polishing article of claim 29, further comprising a biasing member disposed in the pocket between the conductive element and the body.

4 33. (Previously Presented) The polishing article of claim 29, wherein the conductive element is selected from at least one of the group of conductive tubing, a brush, a spring, a pin, a bar, a rod, a coil, a cylinder, a roller, a ball, or combinations thereof.

5 34. (Original) The polishing article of claim 29, wherein the conductive element further comprises a contact surface that extends beyond a plane defined by the polishing surface.

6 35. (Original) The polishing article of claim 34, wherein the contact surface is

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rounded, cylindrical, spherical or comprised of fibers, loops, fingers, strands, or combinations thereof.

36. (Original) The polishing article of claim 29, wherein the conductive element further comprises:

a carrier disposed in the pocket;

a contact member disposed on the carrier; and

wherein at least a portion of the contact member extends beyond a plane defined by the polishing surface.

37. (Original) The polishing article of claim 36, wherein the carrier and contact member are conductive.

38. (Previously Presented) The polishing article of claim 36, wherein the contact member comprises a plurality of balls, pins, a rod, a spring, conductive tubing, a brush, a bar, a coil, a cylinder, a roller, or combinations thereof.

39. (Original) The polishing article of claim 36, wherein at least one of the carrier and contact member is made of graphite.

40. (Original) The polishing article of claim 29, further comprising a connector coupled to the conductive member and adapted to electrically couple the conductive member to a bias power source through or around the body.

42. (Currently Amended) An article of manufacture for polishing a substrate, comprising:

a polishing article comprising a body having at least a partially conductive surface adapted to polish the substrate and a mounting surface, wherein the conductive surface has a resistivity of about 10 Ω -cm or less, wherein the body comprises at least a conductive material having at least a portion of a conductive polymer, conductive filler materials, a polymer composite with conductive materials, or combinations thereof.


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43. (Canceled)

¹³ 44. (Currently Amended) The article of claim ¹² ~~[[43]]~~ ⁴², wherein the conductive filler materials comprise ~~conductive fillers include~~ carbon powder, carbon fibers, carbon nanotubes, carbon nanofoam, carbon aerogels, ~~[[and]]~~ or combinations thereof.

¹⁴ 45. (Currently Amended) The article of claim ¹² ~~[[43]]~~ ⁴², wherein the conductive filler materials comprise carbon powder, carbon fibers, ~~[[and]]~~ or combinations thereof.

46. (Canceled)

 ¹⁵ 47. (Previously Presented) An article of manufacture for polishing a substrate, comprising:

a polishing article comprising a body having at least a partially conductive surface adapted to polish the substrate and a mounting surface, wherein the polishing article further comprises a plurality of perforations formed therein and a plurality of grooves disposed in the polishing surface.

¹⁶ 48. (Previously Presented) The article of claim ¹⁵ ~~47~~, wherein at least a portion of the plurality of grooves intersect with at least a portion of a plurality of perforations disposed in the polishing surface.

¹⁷ 49. (Previously Presented) The article of claim ¹⁵ ~~47~~, wherein the body comprises at least a conductive material having at least a portion of a conductive polymer, conductive filler materials, a polymer composite with conductive materials, a conductive metal, a metal mesh, or combinations thereof.

¹⁸ 50. (Currently Amended) The article of claim ¹⁷ ~~49~~, wherein the conductive filler materials comprise ~~conductive fillers include~~ carbon powder, carbon fibers, carbon nanotubes, carbon nanofoam, carbon aerogels, ~~[[and]]~~ or combinations thereof.

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51. (Currently Amended) The article of claim 48¹⁶, wherein the conductive filler materials comprise ~~conductive fillers include~~ carbon powder, carbon fibers, ~~[[and]]~~ or combinations thereof.

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52. (Previously Presented) The article of claim 47¹⁵, wherein the body comprises a metal mesh disposed in a conventional polishing material.

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53. (Previously Presented) An article of manufacture for polishing a substrate, comprising:

a polishing article comprising a body having at least a partially conductive surface adapted to polish the substrate and a mounting surface, wherein the polishing article further comprises a plurality of perforations formed therein; and

a polishing article support comprising a plurality of perforations disposed therein for flow of material therethrough, wherein the article of manufacture is disposed on the polishing article support.

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54. (Previously Presented) The article of claim 53²¹, wherein a plurality of perforations in the polishing article are aligned with the plurality of perforations of the polishing article support.

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55. (Previously Presented) The article of claim 53²¹, wherein the body comprises at least a conductive material having at least a portion of a conductive polymer, conductive filler materials, a polymer composite with conductive materials, a conductive metal, a metal mesh, or combinations thereof.

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56. (Currently Amended) The article of claim 55²³, wherein the conductive filler materials comprise ~~conductive fillers include~~ carbon powder, carbon fibers, carbon nanotubes, carbon nanofoam, carbon aerogels, ~~[[and]]~~ or combinations thereof.

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57. (Currently Amended) The article of claim 55²³, wherein the conductive filler

materials comprise ~~conductive fillers include~~ carbon powder, carbon fibers, ~~[[and]]~~ or combinations thereof.

²⁰ 58. (Previously Presented) The article of claim ²¹ 53, wherein the body comprises a metal mesh disposed in a conventional polishing material.

²¹ 59. (Previously Presented) An apparatus for processing a substrate, comprising:
a basin;

a permeable disc disposed in the basin;

a polishing article disposed on the permeable disk and at least a portion of the polishing article comprising an electrode, wherein the polishing article comprises a body having at least a partially conductive surface adapted to polish the substrate and a mounting surface, wherein the polishing article further comprises a plurality of perforations formed therein;

a counter electrode disposed in the basin between the permeable disc and the bottom of the basin; and

a polishing head adapted to retain the substrate during processing.

²⁰ 60. (Previously Presented) The article of claim ²⁷ 59, wherein the body comprises at least a conductive material having at least a portion of a conductive polymer, conductive filler materials, a polymer composite with conductive materials, a conductive metal, a metal mesh, or combinations thereof.

²⁹ 61. (Currently Amended) The article of claim ²⁰ 60, wherein the conductive filler materials comprise ~~conductive fillers include~~ carbon powder, carbon fibers, carbon nanotubes, carbon nanofoam, carbon aerogels, ~~[[and]]~~ or combinations thereof.

³⁰ 62. (Currently Amended) The article of claim ²⁰ 60, wherein the conductive filler materials comprise ~~conductive fillers include~~ carbon powder, carbon fibers, ~~[[and]]~~ or combinations thereof.

31 63. (Previously Presented) The article of claim 59, wherein the body comprises a metal mesh disposed in a conventional polishing material.

32 64. (Previously Presented) A polishing article for polishing a substrate, comprising:

a body having a polishing surface adapted to polish the substrate; and
at least one conductive element embedded in the polishing surface, the conductive element having a contact surface that extends beyond a plane defined by the polishing surface; and

a biasing member disposed between the at least conductive element and the body, the biasing member adapted to urge the at least one conductive element towards the polishing surface.

33 65. (Previously Presented) The polishing article of claim 64, wherein the body comprises a dielectric material selected from the group of polyurethane, polycarbonate, polyphenylene sulfide, felt fibers leached with urethane, filled polymers, foamed polymers, and combinations thereof.

34 66. (Previously Presented) The polishing article of claim 64, wherein the body has a plurality of apertures formed therethrough.

35 67. (Previously Presented) The polishing article of claim 64, wherein the biasing member comprises a spring, a foam polymer, plastic tubing, an elastomer, or combinations thereof.

36 68. (Previously Presented) The polishing article of claim 64, wherein the biasing member is resilient and urges a compliant contact surface of the conductive element to electrically contact the substrate disposed on the polishing surface.

37 69. (Previously Presented) The polishing article of claim 64, wherein the at least one conductive element is selected from at least one of the group of conductive tubing,

a brush, a spring, a pin, a bar, a rod, a coil, a cylinder, a roller, a ball, or combinations thereof and combinations thereof.

³⁰70. (Previously Presented) The polishing article of claim ³⁷69, wherein the at least one conductive element comprises carbon, a conductive metal, or combinations thereof.

³⁹71. (Previously Presented) The polishing article of claim ³²64, wherein the biasing member is selected from the group of a spring, a foam polymer, plastic tubing, an elastomer, and combinations thereof, the at least one conductive element is selected from at least one of the group of conductive tubing, a brush, a spring, a pin, a bar, a rod, a coil, a cylinder, a roller, a ball, and combinations thereof, wherein the biasing member urges a compliant contact surface of the conductive element to electrically contact the substrate disposed on the polishing surface.

⁴⁰72. (Previously Presented) The polishing article of claim ³⁹71, wherein the at least one conductive element comprises carbon, a conductive metal, or combinations thereof.

⁴¹73. (Previously Presented) The polishing article of claim ³²64, wherein the at least one conductive element comprises a plurality of graphite or gold balls seated on and electrically coupled through a graphite carrier.

⁴²74. (Previously Presented) The polishing article of claim ³²64, wherein the at least one conductive element comprises one or more graphite rods each seated on a graphite carrier.

⁴³75. (Previously Presented) The polishing article of claim ³²64, wherein the at least one conductive element comprises one or more carbon fibers.

⁴⁴76. (Previously Presented) The polishing article of claim ³²64, wherein the at least

one conductive element comprises a plurality of loop of graphite, gold, or conductive metal, coupled to a tie wire base embedded in the body.

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77. (Previously Presented) A polishing article for polishing a substrate, comprising:

a body having a polishing surface adapted to polish the substrate; and

a plurality of conductive compliant elements embedded in the polishing surface, the conductive compliant elements having a contact surface that extends beyond a plane defined by the polishing surface and is adapted to be urged by the substrate towards the polishing surface; and

a biasing member disposed between the conductive compliant elements and the body.

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78. (Previously Presented) The polishing article of claim 77, wherein the biasing member is selected from the group of a spring, a foam polymer, plastic tubing, an elastomer, and combinations thereof, the at least one conductive element is selected from at least one of the group of conductive tubing, a brush, a spring, a pin, a bar, a rod, a coil, a cylinder, a roller, a ball, and combinations thereof, wherein the at least one conductive element has a compliant contact surface to electrically contact the substrate disposed on the polishing surface.

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79. (Previously Presented) The polishing article of claim 78, wherein the at least one conductive element comprises carbon, a conductive metal, or combinations thereof.

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80. (Previously Presented) The polishing article of claim 77, wherein the at least one conductive element comprises one or more carbon fibers.

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81. (Previously Presented) The polishing article of claim 77, wherein the at least one conductive element comprises a plurality of loop of graphite, gold, or conductive metal, coupled to a tie wire base embedded in the body.

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82. (Previously Presented) A polishing article for polishing a substrate, comprising:

a body having a polishing surface adapted to polish the substrate; and

at least one conductive element embedded in the polishing surface, the conductive element having a contact surface that extends beyond a plane defined by the polishing surface, wherein the contact surface is rounded, cylindrical, spherical or comprised of fibers, loops, fingers, strands, or combinations thereof.

83. (Previously Presented) The polishing article of claim 82, wherein the body comprises a dielectric material selected from the group of polyurethane, polycarbonate, polyphenylene sulfide, felt fibers leached with urethane, filled polymers, foamed polymers, and combinations thereof, and has a plurality of apertures formed therethrough.

84. (Previously Presented) The polishing article of claim 82, wherein the at least one conductive element is selected from at least one of the group of conductive tubing, a brush, a spring, a pin, a bar, a rod, a coil, a cylinder, a roller, a ball, and combinations thereof.

85. (Previously Presented) The polishing article of claim 84, wherein the at least one conductive element comprises carbon, a conductive metal, or combinations thereof.

86. (Previously Presented) The polishing article of claim 82, wherein the at least one conductive element comprises a plurality of graphite or gold balls seated on and electrically coupled through a graphite carrier.

87. (Previously Presented) The polishing article of claim 82, wherein the at least one conductive element comprises one or more graphite rods each seated on a graphite carrier.

88. (Previously Presented) The polishing article of claim 82, wherein the at least one conductive element comprises one or more carbon fibers.

89. (Previously Presented) The polishing article of claim 82, wherein the at least one conductive element comprises a plurality of loop of graphite, gold, or conductive metal, coupled to a tie wire base embedded in the body.

90. (Previously Presented) A polishing article for polishing a substrate, comprising:

a body having a polishing surface adapted to polish the substrate; and
at least one conductive element embedded in the polishing surface, comprising:
a carrier disposed in a pocket formed in the body; and
a contact member disposed on the carrier, the contact member having a contact surface extending beyond a plane defined by the polishing surface.

91. (Previously Presented) The polishing article of claim 90, wherein the carrier and contact member are conductive.

92. (Previously Presented) The polishing article of claim 91, wherein at least one of the carrier and contact member is made of graphite, carbon, a conductive metal, or combinations thereof.

93. (Previously Presented) The polishing article of claim 90, wherein the contact member comprises a plurality of conductive tubing, a brush, springs, pins, bars, rods, coils, cylinders, rollers, balls, or combinations thereof.

94. (Previously Presented) The polishing article of claim 90, wherein the body comprises a dielectric material selected from the group of polyurethane, polycarbonate, polyphenylene sulfide, felt fibers leached with urethane, filled polymers, foamed polymers, and combinations thereof, and has a plurality of apertures formed

therethrough.

63 95. (Previously Presented) The polishing article of claim 90⁵⁰, wherein the at least one conductive element comprises a plurality of graphite or gold balls seated on and electrically coupled through a graphite carrier.

64 96. (Previously Presented) The polishing article of claim 90⁵⁰, wherein the at least one conductive element comprises one or more graphite rods each seated on a graphite carrier.

65 97. (Previously Presented) The polishing article of claim 90⁵⁰, wherein the at least one conductive element comprises one or more carbon fibers disposed on a carrier.

66 98. (Previously Presented) The polishing article of claim 90⁵⁰, wherein the at least one conductive element comprises a plurality of loop of graphite, gold, or conductive metal, coupled to a carrier comprising a tie wire base.

67 99. (Previously Presented) An apparatus for processing a substrate, comprising:
a basin;
a permeable disc disposed in the basin;
a polishing article is disposed on the permeable disc and at least a portion of the polishing article comprising an electrode, wherein the polishing article comprises:
a body having a polishing surface adapted to polish the substrate; and
at least one conductive element embedded in the polishing surface, the conductive element having a contact surface that extends beyond a plane defined by the polishing surface.
a counter electrode disposed in the basin between the permeable disc and the bottom of the basin; and
a polishing head adapted to retain the substrate during processing.